

## Department of Energy

## § 431.15

*Submersible electric motor* means an electric motor that:

- (1) Is intended to operate continuously only while submerged in liquid;
- (2) Is capable of operation while submerged in liquid for an indefinite period of time; and
- (3) Has been sealed to prevent ingress of liquid from contacting the motor's internal parts.

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*Totally enclosed non-ventilated (TENV) electric motor* means an electric motor that is built in a frame-surface cooled, totally enclosed configuration that is designed and equipped to be cooled only by free convection.

TEST PROCEDURES, MATERIALS INCORPORATED AND METHODS OF DETERMINING EFFICIENCY

### § 431.14 Sources for information and guidance.

(a) *General.* The standards listed in this paragraph are referred to in the DOE procedures for testing laboratories, and recognition of accreditation bodies and certification programs but are not incorporated by reference. These sources are given here for information and guidance.

(b) *NVLAP.* National Voluntary Laboratory Accreditation Program, National Institute of Standards and Technology, 100 Bureau Drive, M/S 2140, Gaithersburg, MD 20899-2140, 301-975-4016, or go to <http://www.nist.gov/nvlap/>. Also see <http://www.nist.gov/nvlap/nvlap-handbooks.cfm>.

(1) NVLAP Handbook 150, Procedures and General Requirements, February 2006.

(2) NVLAP Handbook 150-10, Efficiency of Electric Motors, February 2007.

(3) NIST Handbook 150-10 Checklist, Efficiency of Electric Motors Program, (2007-05-04).

(4) NVLAP Lab Bulletin Number: LB-42-2009, Changes to NVLAP Efficiency of Electric Motors Program, March 19, 2009.

(c) *ISO/IEC.* International Organization for Standardization (ISO), 1, ch. de la Voie-Creuse, CP 56, CH-1211 Geneva 20, Switzerland/International Electrotechnical Commission, 3, rue de Varembe, P.O. Box 131, CH-1211 Geneva 20, Switzerland.

(1) ISO/IEC Guide 25, General requirements for the competence of calibration and testing laboratories, 1990.

(2) ISO Guide 27, Guidelines for corrective action to be taken by a certification body in the event of either misapplication of its mark of conformity to a product, or products which bear the mark of the certification body being found to subject persons or property to risk, 1983.

(3) ISO/IEC Guide 28, General rules for a model third-party certification system for products, 2004.

(4) ISO/IEC Guide 58, Calibration and testing laboratory accreditation systems—General requirements for operation and recognition, 1993.

(5) ISO/IEC Guide 65, General requirements for bodies operating product certification systems, 1996.

[77 FR 26634, May 4, 2012]

### § 431.15 Materials incorporated by reference.

(a) *General.* The Department of Energy incorporates by reference the following standards and test procedures into subpart B of part 431. The Director of the Federal Register has approved the material listed for incorporation by reference in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. Any subsequent amendment to a standard by the standard-setting organization will not affect DOE regulations unless and until DOE amends its test procedures. Material is incorporated as it exists on the date of the approval, and a notice of any change in the material will be published in the FEDERAL REGISTER. All approved material is available for inspection at the U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, Building Technologies Program, Sixth Floor, 950 L'Enfant Plaza SW., Washington, DC 20024, (202) 586-2945, or go to [http://www1.eere.energy.gov/buildings/appliance\\_standards/](http://www1.eere.energy.gov/buildings/appliance_standards/). Also, this material is available for inspection at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202-741-6030, or go to: [http://www.archives.gov/federal\\_register/code\\_of\\_federal\\_regulations/ibr\\_locations.html](http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html).

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## 10 CFR Ch. II (1–14 Edition)

(b) *CSA*. Canadian Standards Association, Sales Department, 5060 Spectrum Way, Suite 100, Mississauga, Ontario, L4W 5N6, Canada, 1-800-463-6727, or go to <http://www.shopcsa.ca/onlinestore/welcome.asp>.

(1) *CSA C390-10*, Test methods, marking requirements, and energy efficiency levels for three-phase induction motors, March 2010, IBR approved for §§ 431.12; 431.19; 431.20; appendix B to subpart B of part 431.

(2) [Reserved]

(c) *IEC*. International Electrotechnical Commission Central Office, 3, rue de Varembé, P.O. Box 131, CH-1211 GENEVA 20, Switzerland, +41 22 919 02 11, or go to <http://webstore.iec.ch>.

(1) *IEC 60034-1* Edition 12.0 2010-02, (“*IEC 60034-1*”), Rotating Electrical Machines, Part 1: Rating and Performance, February 2010, IBR approved as follows: section 4: Duty, clause 4.2.1 and Figure 1, IBR approved for § 431.12.

(2) *IEC 60034-12* Edition 2.1 2007-09, (“*IEC 60034-12*”), Rotating Electrical Machines, Part 12: Starting Performance of Single-Speed Three-Phase Cage Induction Motors, September 2007, IBR approved as follows: clauses 5.2, 5.4, 6, and 8, and Tables 1, 2, 3, 4, 5, 6, and 7, IBR approved for § 431.12.

(3) *IEC 60050-411*, International Electrotechnical Vocabulary Chapter 411: Rotating machines, 1996, IBR approved as follows: sections 411-33-07 and 411-37-26, IBR approved for § 431.12.

(4) *IEC 60072-1*, Dimensions and Output Series for Rotating Electrical Machines—Part 1: Frame numbers 56 to 400 and flange numbers 55 to 1080, 1991, IBR approved as follows: clauses 2, 3, 4.1, 6.1, 7, and 10, and Tables 1, 2 and 4, IBR approved for § 431.12.

(d) *IEEE*. Institute of Electrical and Electronics Engineers, Inc., 445 Hoes Lane, P.O. Box 1331, Piscataway, NJ 08855-1331, 1-800-678-IEEE (4333), or <http://www.ieee.org/web/publications/home/index.html>.

(1) *IEEE Std 112-2004*, Test Procedure for Polyphase Induction Motors and Generators, approved February 9, 2004, IBR approved as follows: section 6.4, Efficiency Test Method B, Input-Output with Loss Segregation, IBR approved for §§ 431.12; 431.19; 431.20; appendix B to subpart B of part 431.

(2) [Reserved]

(e) *NEMA*. National Electrical Manufacturers Association, 1300 North 17th Street, Suite 1752, Rosslyn, Virginia 22209, 703-841-3200, or go to <http://www.nema.org/>.

(1) *NEMA Standards Publication MG1-2009* (“*NEMA MG1-2009*”), Motors and Generators, copyright 2009, IBR approved as follows:

(i) Section I, General Standards Applying to All Machines, Part 1, Referenced Standards and Definitions, paragraphs 1.18.1, 1.18.1.1, 1.19.1.1, 1.19.1.2, 1.19.1.3, and 1.40.1, IBR approved for § 431.12;

(ii) Section I, General Standards Applying to All Machines, Part 4, Dimensions, Tolerances, and Mounting, paragraphs 4.1, 4.2.1, 4.2.2, 4.4.1, 4.4.2, 4.4.4, 4.4.5, and 4.4.6, Figures 4-1, 4-2, 4-3, 4-4, and 4-5, and Table 4-2, IBR approved for § 431.12;

(iii) Section II, Small (Fractional) and Medium (Integral) Machines, Part 12, Tests and Performance—AC and DC Motors:

(A) Paragraphs 12.35.1, 12.35.2, 12.38.1, 12.38.2, 12.39.1, 12.39.2, and 12.40.1, 12.40.2, and Tables 12-2, 12-3, and 12-10, IBR approved for § 431.12;

(B) Paragraph 12.58.1, IBR approved for § 431.12 and appendix B to subpart B of part 431;

(C) Paragraph 12.58.2, IBR approved for § 431.31.

(iv) Section II, Small (Fractional) and Medium (Integral) Machines, Part 14, Application Data—AC and DC Small and Medium Machines, paragraphs 14.2 and 14.3, IBR approved for § 431.12.

(2) *NEMA Standards Publication MG1-1967*, (“*NEMA MG1-1967*”), Motors and Generators, January 1968, IBR approved as follows:

(i) Part 11, Dimensions, IBR approved for § 431.12;

(ii) Part 13, Frame Assignments—A-C Integral-Horsepower Motors, IBR approved for § 431.12.

(f) *NFPA*. National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02169-7471, 617-770-3000, or go to <http://nfpa.org/>.

(1) *NFPA 20*, 2010 Edition, Standard for the Installation of Stationary Pumps for Fire Protection, section 9.5, IBR approved for § 431.12.

(2) (Reserved)

[77 FR 26634, May 4, 2012]

## Department of Energy

## § 431.17

EFFECTIVE DATE NOTE: At 78 FR 75994, Dec.13, 2013, § 431.15 was amended by adding paragraph (e)(1)(iii)(D), effective Jan. 13, 2014. For the convenience of the user, the added text is set forth as follows:

### § 431.15 Materials incorporated by reference.

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(e) \* \* \*

(1) \* \* \*

(iii) \* \* \*

(D) Paragraphs 12.62 and 12.63, IBR approved for § 431.12.

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### § 431.16 Test procedures for the measurement of energy efficiency.

For purposes of 10 CFR part 431 and EPCA, the test procedures for measuring the energy efficiency of an electric motor shall be the test procedures specified in appendix B to this subpart B.

### § 431.17 Determination of efficiency.

When a party determines the energy efficiency of an electric motor in order to comply with an obligation imposed on it by or pursuant to Part C of Title III of EPCA, 42 U.S.C. 6311–6316, this Section applies. This section does not apply to enforcement testing conducted pursuant to § 431.192.

(a) *Provisions applicable to all electric motors*—(1) *General requirements*. The average full load efficiency of each basic model of electric motor must be determined either by testing in accordance with § 431.16 of this subpart, or by application of an alternative efficiency determination method (AEDM) that meets the requirements of paragraphs (a)(2) and (3) of this section, provided, however, that an AEDM may be used to determine the average full load efficiency of one or more of a manufacturer's basic models only if the average full load efficiency of at least five of its other basic models is determined through testing.

(2) *Alternative efficiency determination method*. An AEDM applied to a basic model must be:

(i) Derived from a mathematical model that represents the mechanical and electrical characteristics of that basic model, and

(ii) Based on engineering or statistical analysis, computer simulation or modeling, or other analytic evaluation of performance data.

(3) *Substantiation of an alternative efficiency determination method*. Before an AEDM is used, its accuracy and reliability must be substantiated as follows:

(i) The AEDM must be applied to at least five basic models that have been tested in accordance with § 431.16, and

(ii) The predicted total power loss for each such basic model, calculated by applying the AEDM, must be within plus or minus ten percent of the mean total power loss determined from the testing of that basic model.

(4) *Subsequent verification of an AEDM*. (i) Each manufacturer shall periodically select basic models representative of those to which it has applied an AEDM, and for each basic model selected shall either:

(A) Subject a sample of units to testing in accordance with §§ 431.16 and 431.17(b)(2) by an accredited laboratory that meets the requirements of § 431.18;

(B) Have a certification body recognized under § 431.20 certify its nominal full load efficiency; or

(C) Have an independent state-registered professional engineer, who is qualified to perform an evaluation of electric motor efficiency in a highly competent manner and who is not an employee of the manufacturer, review the manufacturer's representations and certify that the results of the AEDM accurately represent the total power loss and nominal full load efficiency of the basic model.

(ii) Each manufacturer that has used an AEDM under this section shall have available for inspection by the Department of Energy records showing: the method or methods used; the mathematical model, the engineering or statistical analysis, computer simulation or modeling, and other analytic evaluation of performance data on which the AEDM is based; complete test data, product information, and related information that the manufacturer has generated or acquired pursuant to paragraphs (a)(3) and (a)(4)(i) of this section; and the calculations used to determine the average full load efficiency